

WHAT IS CLAIMED IS:

1. A variable stiffness heating catheter for use in interventional vascular therapy, comprising:

a heating catheter shaft having a proximal end and a distal end, said heating catheter shaft including at least one electrically conductive member;

5 a reinforcing tube attached to the heating catheter shaft, the heating catheter shaft extending through said reinforcing tube, and said reinforcing tube having a surface defining a plurality of apertures to provide variations in stiffness along the length of the heating catheter shaft.

2. The variable stiffness heating catheter of Claim 1, further comprising at least one outer coaxial sheath over at least a portion of said heating catheter shaft and said reinforcing tube.

3. The variable stiffness heating catheter of Claim 1, wherein said plurality of apertures comprise axial slits formed in the surface of the reinforcing tube.

4. The variable stiffness heating catheter of Claim 1, wherein the apertures can be formed as helical slits in the surface of the reinforcing tube.

5. The variable stiffness heating catheter of Claim 1, wherein the outer surface of the reinforcing tube is tapered along its length.

6. The variable stiffness heating catheter of Claim 1, wherein the apertures comprise a plurality of lateral slits formed in the surface of the reinforcing tube.

7. The variable stiffness heating catheter of Claim 5, wherein the outer surface of the reinforcing tube is tapered at the point where the apertures are formed in the reinforcing tube.

8. The variable stiffness heating catheter of Claim 7, wherein the outer surface of the reinforcing tube is tapered at a distal portion of the reinforcing tube, whereby said heating catheter is torqueable and pushable at the proximal end, yet soft and flexible at the distal end.

9. The variable stiffness heating catheter of Claim 2, wherein said outer coaxial sheath is formed from a material selected from the group consisting of a polymer, metal, or a combination thereof.

10. The variable stiffness heating catheter of Claim 9, wherein said polymer comprises heat shrink polymeric material.

11. The variable stiffness heating catheter of Claim 10, wherein said polymer is selected from the group consisting of polyethylene, polytetrafluoroethylene, polyethylene terephthalate, polyetheretherketone, and polyphenylenesulfide.

12. The variable stiffness heating catheter of Claim 2, wherein said at least one electrically conductive member comprises a pair of electrically conductive wires.

13. A variable stiffness heating catheter for use in interventional vascular therapy, comprising:

a heating catheter shaft having a proximal end and a distal end, said heating catheter shaft including at least one electrically conductive member;

5 a reinforcing tube attached to the heating catheter shaft, the heating catheter shaft extending through said reinforcing tube, and said reinforcing tube having a surface defining a plurality of apertures extending in a direction between said proximal and distal ends of said heating catheter shaft; and

10 at least one outer coaxial sheath over at least a portion of said heating catheter shaft and said reinforcing tube, to provide variations in stiffness along the length of the heating catheter shaft.

14. The variable stiffness heating catheter of Claim 13, wherein said plurality of apertures comprise axial slits formed in the surface of the reinforcing tube.

15. The variable stiffness heating catheter of Claim 13, wherein the apertures can be formed as helical slits in the surface of the reinforcing tube.

16. The variable stiffness heating catheter of Claim 13, wherein the outer surface of the reinforcing tube is tapered along its length.

17. The variable stiffness heating catheter of Claim 13, wherein the apertures comprise a plurality of lateral slits formed in the surface of the reinforcing tube.

18. The variable stiffness heating catheter of Claim 16, wherein the outer surface of the reinforcing tube is tapered at the point where the apertures are formed in the reinforcing tube.

19. The variable stiffness heating catheter of Claim 18, wherein the outer surface of the reinforcing tube is tapered at a distal portion of the

reinforcing tube, whereby said heating catheter is torqueable and pushable at the proximal end, yet soft and flexible at the distal end.

20. The variable stiffness heating catheter of Claim 13, wherein said outer coaxial sheath is formed from a material selected from the group consisting of a polymer, metal, or a combination thereof.

21. The variable stiffness heating catheter of Claim 20, wherein said polymer comprises heat shrinkable polymeric material.

22. The variable stiffness heating catheter of Claim 21, wherein said polymer is selected from the group consisting of polyethylene, polytetrafluoroethylene, polyethylene terephthalate, polyetherethyleketone, and polyphenylenesulfide.

23. The variable stiffness heating catheter of Claim 13, wherein said at least one electrically conductive member comprises a pair of electrically conductive wires.